

A composite image showing the Space Shuttle Columbia on the right, ascending vertically with a large plume of white smoke and fire at its base. To the left of the shuttle, the International Space Station (ISS) is shown in orbit, with its complex structure of solar panels and modules clearly visible. The background is a deep blue sky with scattered white clouds. In the bottom left corner, the curved horizon of the Earth is visible, showing a mix of green land and blue oceans.

Turning Experts into Expert Teams

**Project Management Challenge 2006
Third Annual NASA PM Conference**

David Rogers
SAIC
March 2006



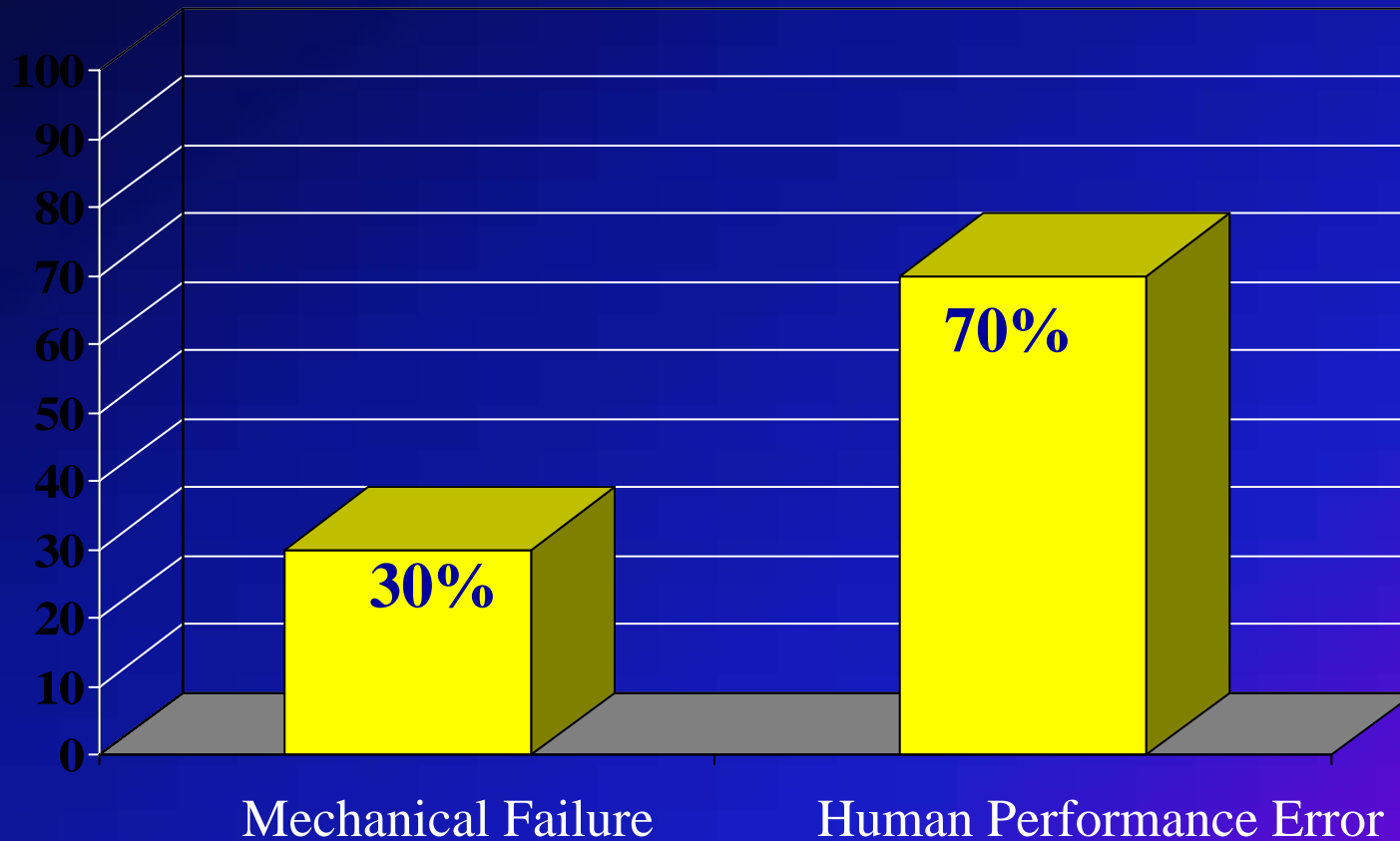
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Where is NASA's greatest threat?



Where is it at the program/project level?

Space Flight Resource Management

- First developed and formally trained for the astronaut and the Flight Control community in 1997
- Why SFRM and how does it differ from Crew Resource Management (CRM) Training?

SFRM

- Secures Management support
- Content tailored to Space Flight Operations and target audience:
Astronaut, Flight Control, SSP MMT and NASA management
- Establishes debriefings to continually reinforce concepts and facilitate continual team/organizational improvement
- Crew/Team-Centered Debriefing with CDR/FD/MMT Chair or Project Manager assuring accountability

SFRM Strategic Goals

- Increase the team and individual effectiveness
- Achieve true transfer of training by actively evaluating and applying lessons learned
- Model NASA's values and continually advance the recent cultural change improvements

SFRM Definition

Space Flight Resource Management (SFRM) is the exercise of **behaviors/skills** designed to improve the ability of individuals and teams to minimize the occurrence and negative consequences of **human performance errors**.

Program/project Risk Management

Error Avoidance, Containment and Mitigation

←Time to make Decisions →

Program
Decisions (PRCB)

APOLLO 1
CHALLENGER
COLUMBIA

Flight Decisions
(FRR)

APOLLO 1
CHALLENGER
COLUMBIA

Launch & Mission
Decisions (MMT)

CHALLENGER
COLUMBIA

Structure of SFRM Performance Elements

Critical Element

Core Elements

Foundation Elements



Command

Command is the exercise of **authority** to ensure that team/mission objectives are successfully completed.

- Program/project Manager's Authority
- Team Member Authority
- Responsibility
- Accountability
- Team Coordination

Leadership

The exercise of behaviors/skills by leaders and team members to ensure team/mission objectives are completed in a safe, efficient and effective manner.

- Team Climate
- Mentoring
- Professionalism
- Conflict Resolution

Communication

The process of exchanging information, ideas, and thoughts in an accurate and timely manner that includes an assurance that the message is clearly received and understood.

- Effective Team Communication
- Inquiry
- Advocacy
- Recognition of Barriers to Effective Communication

Communication

Signals of Intuition

Fear	(perception of consequences)
Apprehension	(incomplete analysis)
Suspicion	(what is the data saying?)
Hesitation	(assumptions, data pedigree)
Doubt	(critical thinking)
Hunches/Gut Feeling	(based on expertise)
Curiosity	(looking beyond the obvious)

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Workload Management

The process of evenly distributing activities by planning, prioritizing, and assigning tasks to individual team members.

- Planning and Prioritizing
- Overload Recognition
- Task Assignment

Situational Awareness

Continuous ability of the **team** acting as a single entity to accurately perceive the relationship of themselves and their surroundings. Forecasting and executing tasks must be based on that perception.

- **Monitor and Anticipate**
- **Recognition of Indications of Low Situational Awareness**

Indications of Low Situational Awareness



"Nurse, get on the internet, go to SURGERY.COM, scroll down and click on the 'Are you totally lost?' icon."

Indications of Low Situational Awareness

- Target projections/milestones not being met
- Inappropriate procedures/processes
- Distractions/Losing focus
- Poor communication
- Unresolved problems/conflicts
- Complacency
- Having an “uneasy” feeling

Situational Awareness

Regaining Team Situational Awareness

- Examine the presence and quality of core elements

Core Elements



Decision Making

Process of determining and implementing the best course of action and evaluating the outcome.

- Decision Making Type
- Problem Identification
- Decision Making Process
 - Experience Based Decision Making
 - Traditional Method Decision Making
- Evaluate the outcome

Why Debrief & Self-Critique?

- Experience does NOT immediately transfer to Expertise
- Debriefing and Self-Critique become the means to turn experts into expert TEAMS
- Facilitates continued organizational/team improvement
 - Culture is about what people do
 - It's a “marathon” not a “sprint”- requires patience, and resolve
 - Draws upon our professional attitudes
- Proactively replaces the “refresher” training mindset

Debriefing

How would you describe or characterize your experiences with debriefing?

What makes for an effective debrief?

Effective Debrief Characteristics

- **Established Expectations**

Open, Honest, No Excuses, No Egos

- **Professional Motivation/Attitude**

When errors occur, they will be corrected.

The success the program and ultimately the assurance of crew/vehicle safety and mission success depends on it

- **Accountability Focus**

Centers on what **we** did as a team and how **my** actions contributed to the effectiveness of the team and to the eventual decisions made

Barriers to Effective Debriefs

- Fear of retribution and or embarrassment
- Personalities/Egos
- Too tired
- Too long, too complicated, no goals, no structure
- Shallow - Focus only on outcomes and glossing over the process
- Over reliance on external expert observations

SFRM Debriefing Guidelines

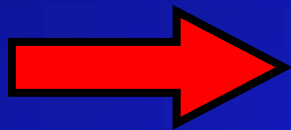
- **Articulate debrief expectations**
- **Remain Team-Centered**
 - Open, honest, positive dialogue
- **Hold Yourself and Team Accountable**
 - Conduct a debrief/self-critique
 - Achieve debrief objectives

SFRM Debriefing Guidelines (continued)

- Focus on the observed behaviors
 - We” and “I”
 - “Look for cause-effect relationships
- Strive for team and individual self-discovery
 - First look at the outcome then dig deeper by analyzing how and why the team got to the decision
- Commit to specific actions and reinforce the positive

Team-Centered Debriefing Objectives

- Team members discuss issues directly with each other
- Team members analyze the observed behaviors/skills
 - Effect upon the outcome of the decision
 - Effect upon the decision-making process
- Team members discover WHAT happened and WHY
- Team transfers the lessons to lessons learned
 - Develops a corrective action plan
 - Reinforces positive behaviors/skills
- Team demonstrates their commitment and understanding of the value of the debrief process



Develop self-critiquing habits

Incorporating SFRM Debriefs

Leader

- Think out of the box...Look for opportunities to initiate a team debrief. (Sims, Flight, Major decisions)
- Debrief to the level necessary to discover weaknesses, develop strategies, commit to specific actions for improvement and identify and commend positive

Hint: Examine SFRM behaviors/skills demonstrated during each major event or decision made by the team. Ask yourself what made that event or decision particularly easy or difficult?

- Do not underestimate the value of an interim debrief

Summary

- Keep the larger picture in mind
- SFRM Performance Elements and related behaviors/skills
- Responsibility to transfer lessons to lessons learned
 - Living and breathing not stuffed in a database
- Team-debriefing and Self-critiques is how we get there
- As a program decision-making body...
 - our most serious hazard resides with human error
- How would you rate the current controls in place to prevent yet another repeat of history?
- Anyone can put together a team of experts...

IT TAKES EFFORT TO GET AN EXPERT TEAM